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**UTILITY
PATENT APPLICATION
TRANSMITTAL**

(Only for new nonprovisional applications
under 37 CFR 1.53(b))

Attorney Docket No.

3431.1US

First Inventor or Application Identifier

N. Sandor Racz

Title

CATHETER CONNECTOR

Express Mail Label No.

EM339601256US

APPLICATION ELEMENTS

See MPEP Chapter 600 concerning utility patent application contents

ADDRESS TO:

Assistant Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

1. ☒ Fee Transmittal Form

(Submit an original, and a duplicate for fee processing)

2. ☒ Specification

Total Pages

14

(preferred arrangement set forth below)

- Descriptive title of the invention
- Cross References to related Applications
- Statement Regarding Fed Sponsored R&D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

3. ☒ Drawing(s) (35 USC 113)

Total Sheets

4

4. Oath or Declaration

Total Pages

1

- a. ☐ Newly executed (original or copy)
- b. ☒ Copy from a prior application (37 CFR 1.63(d))

(For continuation/divisional with Box 17 completed)
(Note Box 5 below)

i. ☐ DELETION OF INVENTOR(S)

Signed statement attached deleting
inventor(s) named in the prior
application, see 37 CFR 1.63(d)(2) and
1.33(b).

5. ☒ Incorporation By Reference

(useable if Box 4b is checked)

The entire disclosure of the prior application, from which a
copy of the oath or declaration is supplied under Box 4b, is
considered as being part of the disclosure of the accompanying
application and is hereby incorporated by reference therein.

6. ☐ Microfiche Computer Program (Appendix)

7. ☐ Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)

- a. ☐ Computer Readable Copy
- b. ☐ Paper Copy (identical to computer copy)
- c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment Papers (cover sheet & document(s))

9. ☐ 37CFR 3.73(b) Statement ☐ Power of Attorney
(when there is an assignee)

10. ☐ English Translation Document (if applicable)

11. ☒ Information Disclosure ☐ Copies of IDS
Statement (IDS/PTO-1449) Citations

12. ☒ Preliminary Amendment

13. ☒ Return Receipt Postcard (MPEP 503)

14. ☐ Small Entity ☒ Statement filed in prior application,
Statement(s) Status still proper and desired

15. ☐ Certified Copy of Priority Document(s)
(If foreign priority is claimed)

16. ☐ Other:

*A new statement is required to be entitled to pay small entity fees, except
where one has been filed in a prior application and is being relied upon.

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:

☐ Continuation ☒ Divisional ☐ Continuation-in-part (CIP) of prior Application No. 09/007,460
Prior application information: Examiner G. Cavett Group/Art Unit: 3734

18. CORRESPONDENCE ADDRESS

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Date

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Patent fees are subject to annual revision on October 1.

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Small Entity payments must be supported by a small entity statement, otherwise large entity fees must be paid. See Forms PTO/SB/09-12.**TOTAL AMOUNT OF PAYMENT** (\$)**395.00****Complete if Known**

Application Number	
Filing Date	August 14, 1998
First Named Inventor	N. Sandor Racz
Examiner Name	G. Cavett
Group / Art Unit	3734
Attorney Docket No.	3431.1US

METHOD OF PAYMENT (check one)

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101 790	201 395	Utility filing fee	395
106 330	206 165	Design filing fee	
107 540	207 270	Plant filing fee	
108 790	208 395	Reissue filing fee	
114 150	214 75	Provisional filing fee	
SUBTOTAL (1)			(\$) 395

2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid
19	-20** = 0	11	-0-
2	-3** = 0	41	-0-
Multiple Dependent			

**or number previously paid, if greater; For Reissues, see below

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
103 22	203 11	Claims in excess of 20	
102 82	202 41	Independent claims in excess of 3	
104 270	204 135	Multiple dependent claim, if not paid	
109 82	209 41	** Reissue independent claims over original patent	
110 22	210 11	** Reissue claims in excess of 20 and over original patent	
SUBTOTAL (2)			(\$) -0-

FEE CALCULATION (continued)**3. ADDITIONAL FEES**

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
105 130	205 65	Surcharge - late filing fee or oath	
127 50	227 25	Surcharge - late provisional filing fee or cover sheet.	
139 130	139 130	Non-English specification	
147 2,520	147 2,520	For filing a request for reexamination	
112 920*	112 920*	Requesting publication of SIR prior to Examiner action	
113 1,840*	113 1,840*	Requesting publication of SIR after Examiner action	
115 110	215 55	Extension for reply within first month	
116 400	216 200	Extension for reply within second month	
117 950	217 475	Extension for reply within third month	
118 1,510	218 755	Extension for reply within fourth month	
128 2,060	228 1,030	Extension for reply within fifth month	
119 310	219 155	Notice of Appeal	
120 310	220 155	Filing a brief in support of an appeal	
121 270	221 135	Request for oral hearing	
138 1,510	138 1,510	Petition to institute a public use proceeding	
140 110	240 55	Petition to revive - unavoidable	
141 1,320	241 660	Petition to revive - unintentional	
142 1,320	242 660	Utility issue fee (or reissue)	
143 450	243 225	Design issue fee	
144 670	244 335	Plant issue fee	
122 130	122 130	Petitions to the Commissioner	
123 50	123 50	Petitions related to provisional applications	
126 240	126 240	Submission of Information Disclosure Stmt	
581 40	581 40	Recording each patent assignment per property (times number of properties)	
146 790	246 395	Filing a submission after final rejection (37 CFR 1.129(a))	
149 790	249 395	For each additional invention to be examined (37 CFR 1.129(b))	
Other fee (specify) _____			
Other fee (specify) _____			
SUBTOTAL (3)			(\$)

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SUBMITTED BYTyped or
Printed Name Allen C. Turner

Signature

Date

8/14/98

Complete (if applicable)

Reg. Number 33,041

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

N. Sandor Racz

Serial No.: To be assigned

Filed: August 14, 1998

For: CATHETER CONNECTOR

Examiner: G. Cavett

Group Art Unit: 3734

Attorney Docket No.: 3431.1US

NOTICE OF EXPRESS MAILING

Express Mail Mailing Label

Number: EM339601256US

Date of Deposit with USPS: August 14, 1998

Person making Deposit: Aaron Harmston

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
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Sir:

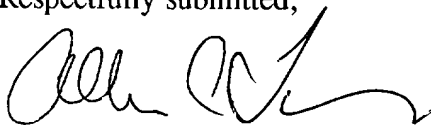
Please cancel claims 20-24, without prejudice.

REMARKS

Claims 1-19 remain in the application. Claims 20-24 are to be cancelled without prejudice as a result of applicant's election of claims 20-24 in the parent application, United States Serial No. 09/007,460.

Applicant requests entry of the foregoing amendment prior to examination of the application on the merits.

Respectfully submitted,



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Date: August 14, 1998

ACT/le

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PATENT
Attorney Docket 3431US

CERTIFICATION UNDER 37 C.F.R. § 1.10

EM574780449US

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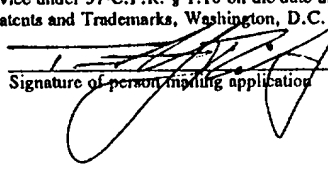
January 15, 1998

Date of Deposit

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Timothy Ricks

Typed or printed name
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Signature of person mailing application

APPLICATION FOR LETTERS PATENT

for

CATHETER CONNECTOR

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CATHETER CONNECTOR

Technical Field: This invention generally relates to connectors for catheters which introduce fluids into body cavities. More specifically, the invention relates to devices disposed within catheter connectors which prevent the dislocation of a catheter tube from a catheter connector.

Background: Catheter connectors are well known. One such device, which is commonly referred to as a "Tuohy-Borst" connector, includes two threaded members which enclose an elongated, compressible O-ring. In use of that device, a catheter tube is inserted into one of the connector members and inserted through a channel defined by the O-ring. Upon engagement of the two threaded members, the O-ring is longitudinally compressed, decreasing the cross-sectional diameter of the channel and frictionally securing the catheter tube therein.

A similar device is disclosed in United States Patent 5,053,015 to Gross (Oct. 1, 1991). The catheter connector of Gross includes a body member, into which a catheter tube is insertable, a compression member which locks onto the body member upon interconnection therewith, and a compressible, elongated plug disposed in the body member. In use of that device, a catheter tube is inserted into the body member and through a channel of the elongated plug. Upon engagement of the body and compression members, the elongated plug is compressed, which decreases the cross-sectional diameter of the channel and frictionally secures the catheter tube therein. The connector assembly of Gross also includes a slip washer, which merely facilitates the rotational interconnection of the body and compression members (*i.e.*, by screwing the complementary threaded body and compression members together).

Such devices are somewhat problematic in that the sole use of a compressible member having a channel formed therethrough may be insufficient to adequately secure a catheter tube within the connector especially if the catheter surface gets wet before insertion of the catheter tube into the connector.

Disclosure of the Invention

Although the previously-described catheter connectors work well for many applications, it has been found that an additional catheter tube-securing element prevents dislocation of a catheter tube from the catheter connector to an even greater degree.

The invention thus includes a compressible lock washer which is useful in a catheter connector. As the lock washer is compressed, the cross-sectional diameter of a tube receptacle formed centrally therethrough decreases, thus securing a tube placed therein. In use, a catheter tube is inserted into a catheter connector assembly, including the lock washer disposed therein. Upon interconnection of the catheter connector members, the lock washer is compressed, decreasing the cross-sectional diameter of the tube receptacle and engaging the catheter tube which runs therethrough.

In another aspect, the invention includes a catheter connector assembly including a compressible lock washer, as previously described, and methods for manufacturing the lock washer and connector.

Brief Description of the Figures

In the drawings, which depict presently preferred embodiments of the invention and in which like reference numerals refer to like parts in different views:

FIG. 1 is an exploded assembly view which depicts an embodiment of a lock washer according to the present invention associated with various catheter connector components.

FIG. 2 depicts the embodiment of the preceding figure and its relation to a gasket.

FIG. 3 depicts an enlarged top plan view of the distal end of the embodiment of the preceding two figures, with the lock washer in a relaxed state.

FIG. 4 depicts an enlarged side plan view of the embodiment of the preceding three figures, with the lock washer in a relaxed state.

FIG. 5 depicts an enlarged top plan view of the distal end of the embodiment of the preceding four figures, with the lock washer in an engaged state.

FIG. 6 depicts an enlarged side plan view of the embodiment of the preceding five figures, with the lock washer in an engaged state.

5 FIG. 7 depicts an enlarged top plan view of the distal end of an alternative embodiment of the lock washer according to the invention.

FIG. 8 depicts an enlarged side plan view of the embodiment of the preceding figure, with the lock washer in a relaxed state.

10 FIG. 9 depicts an enlarged top plan view of the embodiment of the preceding two figures, with the lock washer in an engaged state.

FIG. 10 depicts an enlarged side plan view of the embodiment of the preceding three figures, with the lock washer in an engaged state.

15 FIG. 11 is a cross-sectional assembly view of a connector assembly which includes a lock washer according to the present invention, illustrating the lock washer in an engaged state.

Best Mode of the Invention

20 As shown in FIGs. 1 and 11, a connector lock washer 60 of the present invention is shown in conjunction with a catheter connector generally 20 including a cap 22, a center member 24, an insertion member 28, and a gasket 32.

25 The distal end of the cap 22 includes a body and may also include an elongated cylindrical extension, which is referred to as an alignment element 48. The body of the cap 22 defines an elongated lumen 40 that is open to the proximal end of the cap and extends approximately centrally through the cap and into the alignment element 48 thereof. The alignment element 48 includes an end wall 56, thus lumen 40 includes a closed end. The cap 22 also includes a center member receptacle 51 formed in the distal end thereof for receiving and engaging the proximal end of the center member 24 (*i.e.*, locking element 49, described below). The center member receptacle 51 include an interconnect component 50 (*e.g.*, a LEUR LOCK™ receptacle) formed therein.

The center member 24, which is also referred to as a second member for simplicity, is a generally hollow cylindrical member including a body that defines a lumen 44 entirely therethrough. An insertion member receptacle 26 is disposed about the periphery of the center member 24, proximate the distal end of the same. The insertion member receptacle 26 is configured to receive the proximal end of the insertion member 28 and interconnect therewith (*e.g.*, by threads). The proximal end of the center member 24 includes a hollow, cylindrical extension, which is referred to as a locking element 49. The proximal end of the lumen 44 is defined by locking element 49 and is configured to receive the alignment element 48 of the cap 22. The cross-sectional diameter of the lumen 44 may decrease near the distal end of the center member 24. The locking element 49 includes locking elements 52 (*e.g.*, LEUR LOCK™ extensions) adjacent the distal end thereof, which are configured to engage the interconnect component 50 of the cap 22.

The insertion member 28, which is also referred to as a first member for simplicity, is also a generally hollow cylindrical member including a body that defines an elongated lumen 30 through the center thereof, a distal end 54, and a substantially round aperture 42 formed approximately centrally through the distal end. The proximal end of the insertion member 28 includes an interconnection component 46 (*e.g.*, external threading) that is complementary to a first receptacle 26 (which includes, *e.g.*, internal threading) and configured to interconnect therewith. The lumen 30 is configured to receive a gasket 32. The distal end aperture 42 is configured to facilitate the insertion of a catheter tube 58 therethrough.

The lock washer 60 and gasket 32 are disposed within the lumen 30 of the insertion member 28 and are held into place by the interconnection of the insertion member 28 with the center member 24. In order to interconnect the center member 24 and the insertion member 28, the interconnection component 46 of the insertion member 28 is inserted into and engaged by the receptacle 26 of the distal end of the center member 24.

With reference to FIG. 2, a preferred gasket 32 is an elongated, compressible, resilient, somewhat cylindrical element which defines a channel 34 centrally therethrough. The channel 34 has an inner diameter slightly larger than the outer diameter of a catheter tube 58 to be inserted therein, thus facilitating the insertion of a catheter tube therein. The gasket 32 includes a frustoconically tapered distal end 36 and a proximal end 38. The lock washer 60 abuts the proximal end 38 of the gasket 32.

Referring now to FIGs. 3 and 4, a preferred lock washer 60 includes a support ring 62, which is also referred to as a ring for simplicity, formed or positioned around the perimeter thereof are flared tube engagement flanges 64A, 64B, 64C, 64D extending centrally from the ring 62. A compression slot 68A, 68B, 68C, 68D is defined by the lateral edges of each adjacent pair of tube engagement flanges 64, and is therefore located therebetween. FIGs. 3 and 4 depict the lock washer 60 and its tube engagement flanges 64A, 64B, 64C, 64D in a relaxed, or flared, state. As FIG. 4 illustrates, in the relaxed state of the lock washer 60 and the tube engagement flanges 64A, 64B, 64C, 64D, the tube engagement flanges impart the lock washer with a generally conical shape. Each tube engagement flange 64 is a resilient member that includes a central tip 66A, 66B, 66C, 66D. Preferably, each central tip 66 includes a concave arc 70A, 70B, 70C, 70D. The collective, concave shape of all of the central tips 66A, 66B, 66C, 66D defines a generally rounded tube receptacle 72 through the center of the lock washer 60. Thus, the central tips 66A, 66B, 66C, 66D, and therefore the tube receptacle 72, are configured to receive a catheter tube 58 (*see* FIG. 11) inserted through the lock washer 60 while the lock washer is in the relaxed state (*see* FIGs. 3 and 4), and engage the catheter tube without damaging or closing off the lumen through the same as the lock washer 60 is placed into the engaged state.

FIGs. 5 and 6 illustrate lock washer 60 and its tube engagement flanges 64 in an engaged state, wherein the tube engagement flanges are flexed towards the center of a plaque in which the ring 62 lies. Consequently, the lateral edges of adjacent tube engagement flanges 64 are forced toward one another and the size of the compression

slots 68A, 68B, 68C, 68D is reduced. Additionally, the cross-sectional diameter of tube receptacle 72 is thus decreased, such that it is at least slightly smaller than the outer diameter of a catheter tube 58 insertable therethrough.

FIGs. 7 through 10 show an alternative embodiment of the lock washer 60', which includes a support ring 62' formed around the perimeter thereof, flared tube engagement flanges 64A', 64B', 64C', 64D' and a thin, flexible, resilient, collapsible web 68'A, 68'B, 68'C, 68'D disposed between and adjoining the lateral edges of adjacent tube engagement flanges 64'. FIGs. 7 and 8 illustrate the lock washer 60' in a relaxed, or flared, state, wherein the lock washer has a generally conical appearance. FIGs. 9 and 10 show the lock washer 60' in an engaged state, wherein the tube engagement flanges 64A', 64B', 64C', 64D' have been flexed toward the ring 62'.

Each tube engagement flange 64A', 64B', 64C', 64D' is a resilient member that includes a central tip 66A', 66B', 66C', 66D'. Preferably, the central tips 66A-D' are collectively configured to receive a catheter tube 58 (see FIG. 11) while the lock washer 60' is in the relaxed state, and engage the catheter tube without damaging or closing off the lumen through the same as the lock washer is compressed into the engaged state.

Webs 68'A, 68'B, 68'C, 68'D are collapsible, resilient elements which facilitate the transition of the tube engagement flanges 64A', 64B', 64C', 64D', and therefore the lock washer 60', from the engaged state to the relaxed state following the release of a transverse load thereon. While the lock washer 60' is in the engaged state, as depicted in FIGs. 9 and 10, the tube engagement flanges 64A', 64B', 64C', 64D' are flexed toward the center of the ring 62', and their lateral edges are therefore forced laterally towards one another. Consequently, webs 68' fold or collapse upon themselves in their engaged state. Additionally, the diameter of tube receptacle 72' is also decreased, such that it is at least slightly smaller than the outer diameter of catheter tube 58 (see FIG. 11) insertable therein in order to engage the catheter tube.

Referring again to FIG. 11, as the insertion member 28 and the center member 24 are interconnected, the lock washer 60 and the gasket 32 are forced together and

compressed along their respective transverse axes. Thus, a transverse load is exerted on the lock washer 60, compressing it into the engaged state (illustrated in FIGs. 5 and 6). Therefore, the cross-sectional diameter of tube receptacle is decreased such that the catheter tube 58 extending therethrough is engaged by the compressed the lock washer 60. Similarly, the channel 34 of the gasket 32 is compressed, decreasing its cross-sectional diameter such that the gasket will frictionally engage a catheter tube 58 that extends therethrough.

With continued reference to FIG. 11, as an example of the use of the catheter connector 20, a proximal end of a catheter tube 58 that runs from a patient is inserted into the aperture 42 formed through the distal end 54 of the insertion member 28. The catheter tube 58 is then inserted through the channel 34 of the gasket 32, through the tube receptacle 72 of the lock washer 60, and into the lumen 44 of the center member 24. Interconnection of the insertion member 28 and the center member 24 exerts a transverse load on the tube engagement flanges 64A', 64B', 64C', 64D' of the lock washer 60, compressing the lock washer into an engaged position and thereby securing the catheter tube 58 within the catheter connector 20. The engagement of the insertion member 28 and the center member 24 also compresses the gasket 32, decreasing the diameter of the channel 34 so that the gasket frictionally engages the catheter tube 58 extending therethrough. Upon removal of the cap 22 from the center member 24, the lumen of the catheter tube 58 is exposed for connection to another device or for the introduction of substances therein or the removal of fluids therethrough.

Although shown in use as a catheter connector, the invention may also be used to establish and maintain a fluidic connect between other types of tubes.

After being apprised of the devices according to the invention, methods of making them will become readily apparent to those of skill in the art. For instance, a lock washer can be made from a hypoallergenic, firm, resilient plastic material such as acrylonitrile butadiene styrene (ABS), acetyl, nylon, polycarbonate, polyesters, polyethylene, polypropylene, polystyrene, polysulfone, polyurethane, and polyvinyl chloride (PVC). Likewise, a cap, insertion member, and center member may be

manufactured from similar materials and by methods which are readily apparent to those of skill in the art. The gasket can be made from a hypoallergenic, collapsible, resilient, low durometer elastomeric material such as a urethane.

Furthermore, the lock washer and connector assembly might otherwise be modified. For instance, in its relaxed state, the lock washer may have a substantially hemispherical appearance. The tube engagement flanges will typically number from three to eight per each lock washer. The connector disclosed herein will work with most types of catheters. The lock washer disclosed herein will work with most Tuohy-Borst catheter connectors. The size of the lock washer and connector will be chosen dependent on the size of the catheter. Typically however, for epidural applications, the lock washer has a diameter of less than about 1 cm and the catheter tube secured thereby has outer diameter of about one mm. As another example, an element other than the described cap, such as a LEUR LOCKTM syringe, may be joined to the connector.

Although the invention has been described with regard to certain preferred embodiments, the scope of the invention is to be defined by the appended claims.

Claims

What is claimed is:

1. A lock washer for use in a catheter connector, comprising:
a ring defining a periphery of the lock washer; and
5 a plurality of tube engagement flanges associated with and extending centrally from said ring, each of said tube engagement flanges having a central tip, central tips of at least selected ones of said plurality of tube engagement flanges defining a tube receptacle for receiving and retaining a tube within said lock washer.
- 10 2. The lock washer of claim 1, wherein each of said tube engagement flanges is resilient.
3. The lock washer of claim 1, wherein adjacent ones of said tube engagement flanges define a compression slot therebetween.
- 15 4. The lock washer of claim 1, further comprising a collapsible, web disposed between adjacent ones of said tube engagement flanges.
5. The lock washer of claim 1, wherein said tube engagement flanges are
20 flexible towards the center of a plane defined by the periphery of said ring.
6. The lock washer of claim 5, wherein upon flexion of said tube engagement flanges towards the center of said ring, the diameter of said tube receptacle decreases.
- 25 7. The lock washer of claim 5, wherein following the release of a compressive load from said lock washer periphery, said tube engagement flanges resiliently flex back to a relaxed state.

8. The lock washer of claim 5, wherein adjacent ones of said tube engagement flanges define a compression slot therebetween.

5 9. The lock washer of claim 5, further comprising a web disposed between adjacent ones of said tube engagement flanges.

10. The lock washer of claim 9, wherein, upon flexion of said adjacent ones of said tube engagement flanges toward said ring, said web collapses upon itself.

10 11. The lock washer of claim 9, wherein, following flexion of said tube engagement flanges, said tube engagement flanges return to a relaxed state and said web re-expands to an original state.

15 12. The lock washer of claim 1, wherein each said central tip comprises a concave arc.

20 13. A lock washer comprising:
a ring defining a periphery of the lock washer; and
a plurality of resilient tube engagement flanges associated with said ring and extending therefrom, each of said tube engagement flanges having a relaxed state and an engaged state, and each including a central tip, said central tips of selected ones of said plurality of tube engagement flanges defining a tube receptacle through the lock washer for receiving a tube.

25 14. The lock washer of claim 13, wherein adjacent ones of said tube engagement flanges define a compression slot therebetween.

15. The lock washer of claim 13, further comprising a web extending between and adjoining adjacent ones of said tube engagement flanges.

16. The lock washer of claim 13, wherein each of said tube engagement flanges are proximally compressible with respect to said ring.

17. The lock washer of claim 17, wherein, upon applying a compressive load to said tube engagement flanges, said tube engagement flanges flex into said engaged state.

18. The lock washer of claim 17, wherein, upon compression of said tube engagement flanges, the inner diameter of said tube receptacle decreases.

19. The lock washer of claim 17, wherein, following the release of a compressive load, said tube engagement flanges flex into said relaxed state.

20. A catheter connector assembly comprising:
a first member including a body which defines a first lumen therethrough;
a second member having a first and second ends and including a body which defines a second lumen therethrough, said second member being interconnectable with said first member at said first end; and

a lock washer disposed within one of said first and said second lumens, said lock washer including a ring and a plurality of compressible tube engagement flanges associated therewith extending centrally therefrom and defining a tube receptacle.

21. The catheter connector assembly of claim 20, wherein each of said tube engagement flanges includes a central tip, all of said central tips defining a tube receptacle through said lock washer upon compression of the lock washer.

22. The catheter connector assembly of claim 21, further comprising a cap interconnectable with the second end of said second member.

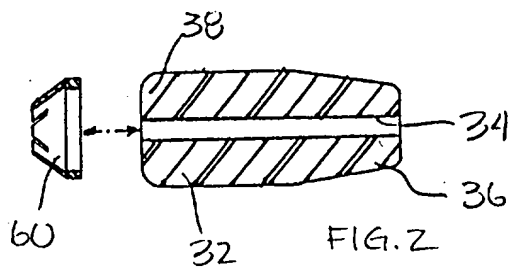
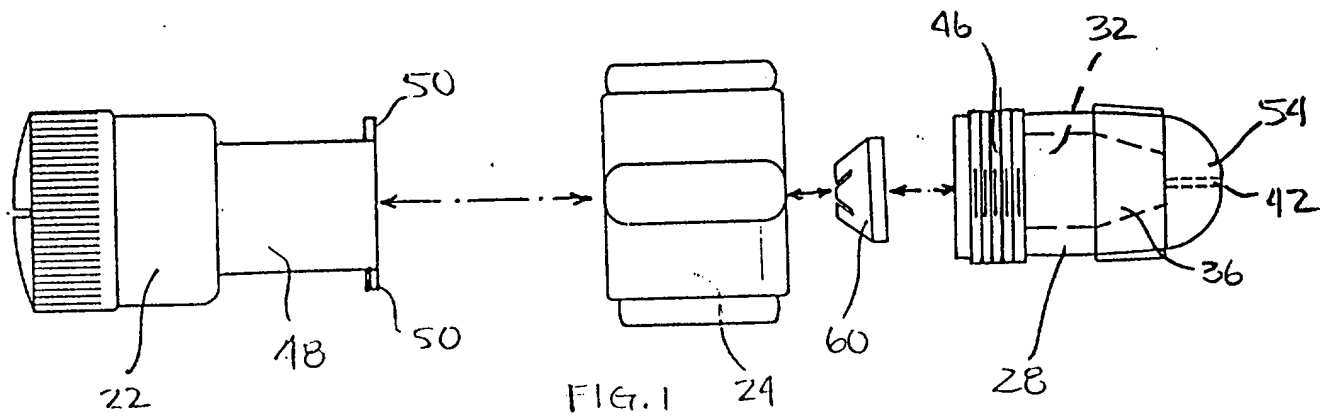
23. The catheter connector assembly of claim 22, wherein interconnection of said first member and said second member decreases the diameter of said tube receptacle.

5 24. The catheter connector assembly of claim 21, further comprising a tube positioned within said tube receptacle.

Abstract

Compressible lock washers for use in catheter connectors. One such lock washer (60) includes a support ring (62) and tube engagement flanges (64) extending centrally therefrom, oblique to the ring and each extending from the same side thereof. The tube engagement flanges (64) define a tube receptacle (72) through which a catheter tube (58) may be inserted. Upon compression of the lock washer (60), the tube engagement flanges (64) are forced toward the ring (62), decreasing the diameter of the tube receptacle (72). Thus, during compression of the lock washer (60), the tube engagement flanges (64) engage the catheter tube (58) which runs through the tube receptacle (72), securing the catheter tube within the catheter connector (20) with which the lock washer is associated.

20



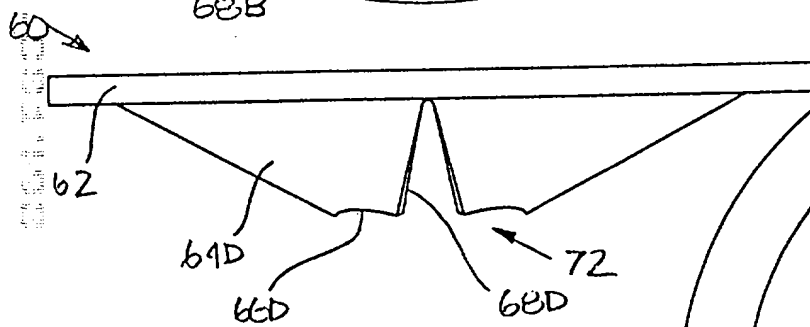
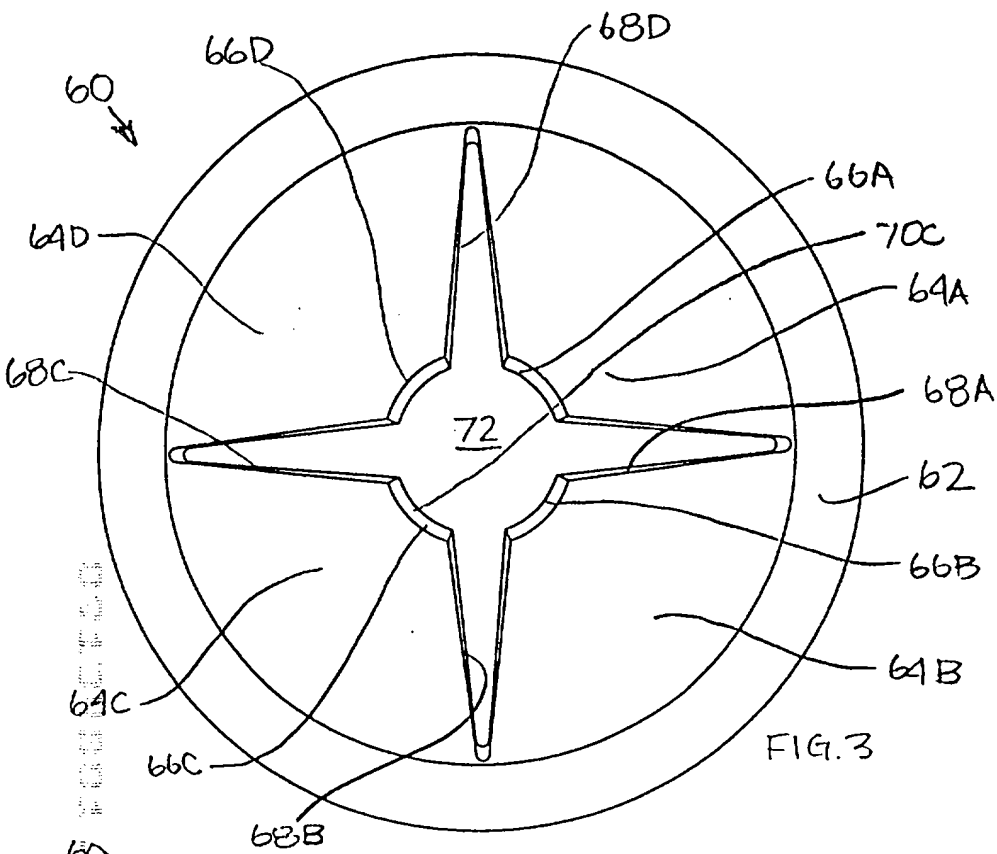


FIG. 4

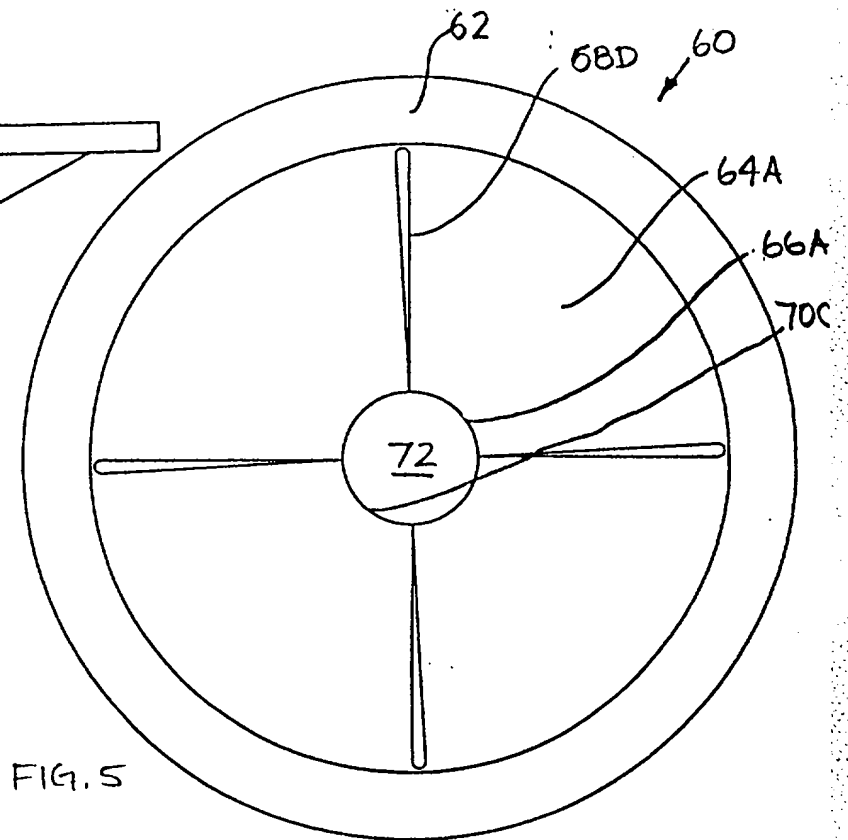


FIG. 5

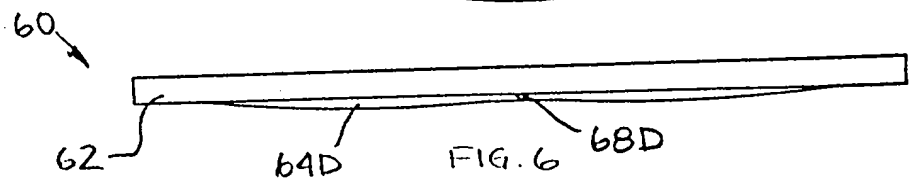


FIG. 6

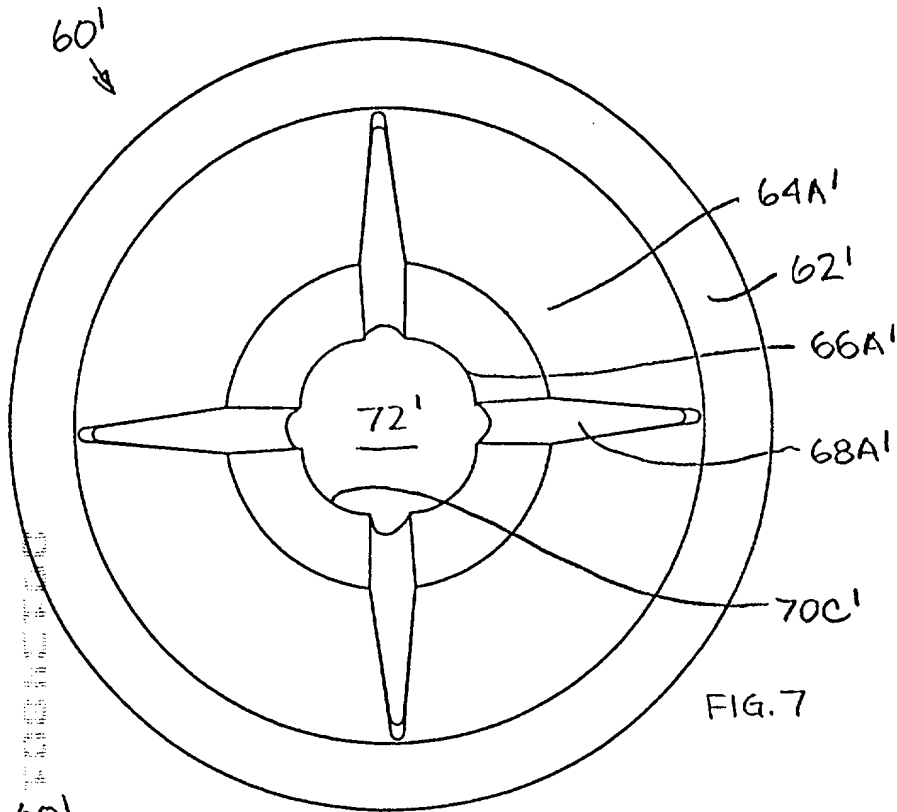


FIG. 7

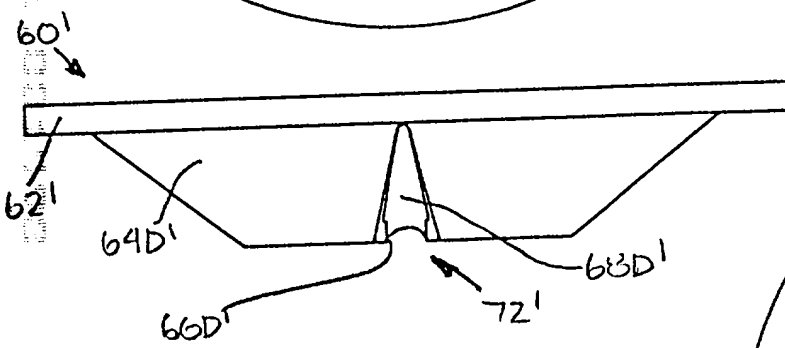


FIG. 8

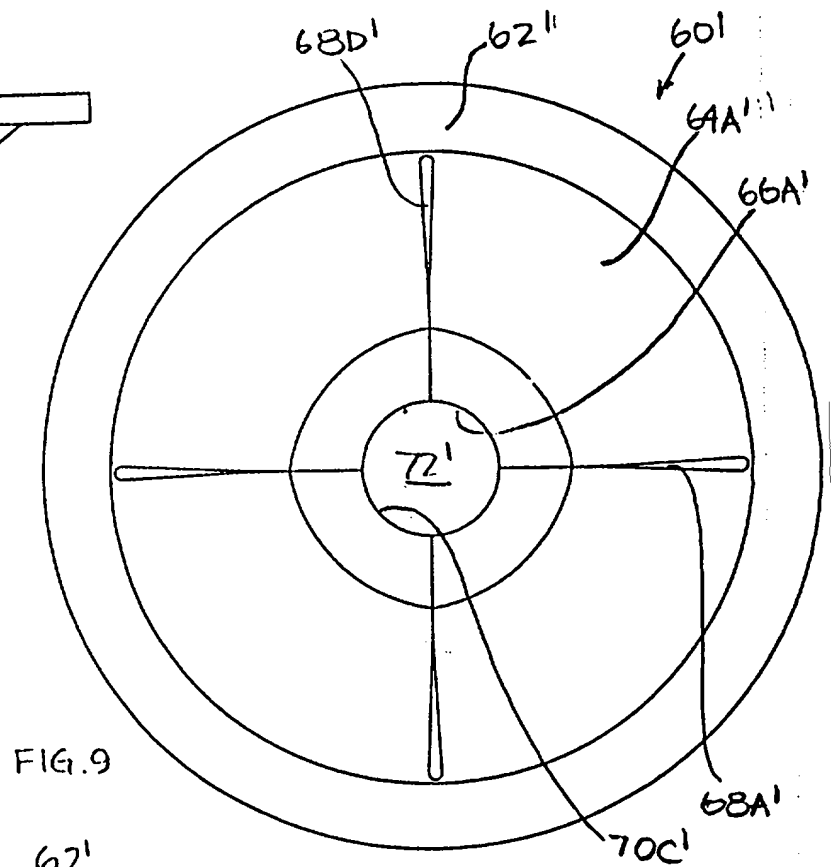


FIG. 9

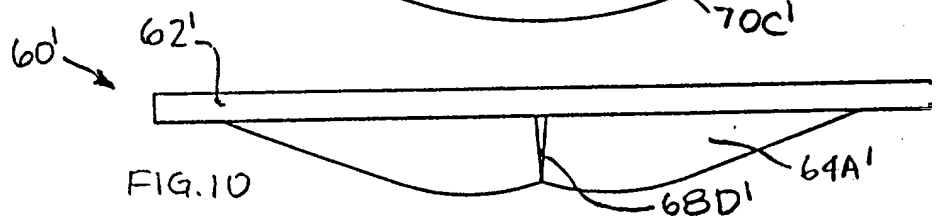
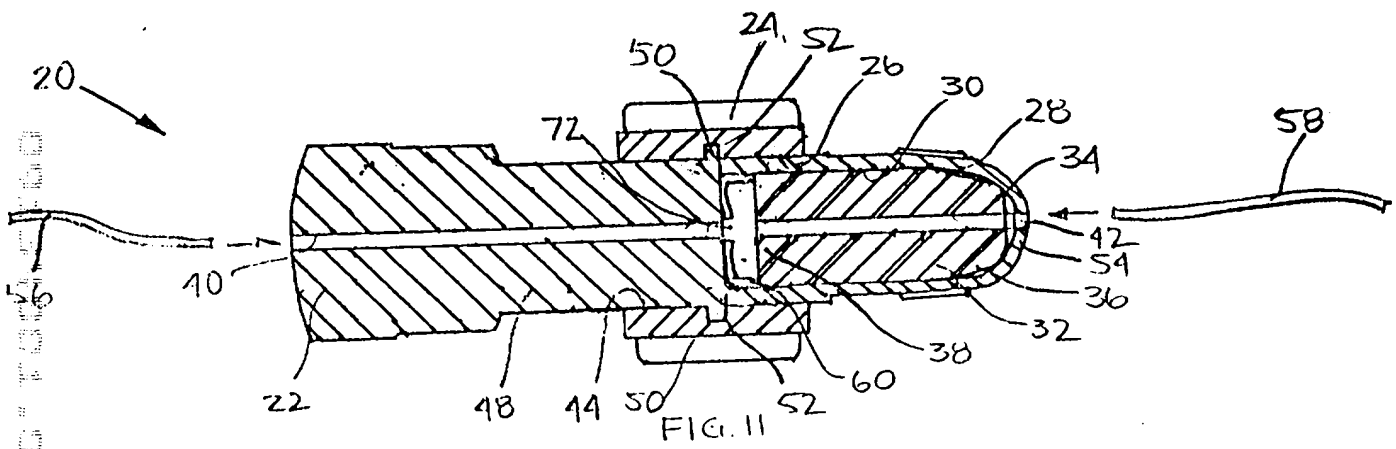


FIG. 10



DECLARATION FOR PATENT APPLICATION (WITH POWER OF ATTORNEY)

As an inventor named below or on any attached continuation page, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled CATHETER CONNECTOR, the specification of which (check one):

☒ is attached hereto.

☐ was filed on _____ as United States application serial no. _____ and was amended on _____.

☐ was filed on _____ as PCT international application no. _____ and was amended under PCT Article 19 on _____.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and on any attached continuation page and have also identified below and on any attached continuation page any foreign application for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America having a filing date before that of the application(s) on which priority is claimed.

Prior foreign/PCT application(s):

(number)	(country)	(day/month/year filed)	Priority Claimed	
			Yes	No
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America listed below and on any attached continuation page and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

(application serial no.)	(filing date)	(status - pending, patented or abandoned)
_____	_____	_____
_____	_____	_____

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

(provisional application no.)	(filing date)
_____	_____
_____	_____
_____	_____

I hereby appoint the following Registered Practitioners to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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Salt Lake City, Utah 84110

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole inventor: N. Sangor Raoz

Inventor's signature N. Sangor Raoz Date 11/12/98

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